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OFFICIAL ORGAN OF THE

NEW JERSEY FORESTRY ASSOCIATION.

VOLUME II. MAY 1, 1896. No. 3.

CONTENTS.

PAGE

FRONTISPIECE—Portrait of B. E. Fernow, Chief of the Division of Forestry, Department of Agriculture.

NOTICE OF MEETING OF NEW JERSEY FORESTRY ASSOCIATION in Plainfield, afternoon and evening of May 21st 33

EDITORIAL ON THE PREVENTION OF FIRES 33

FORESTRY AT BILTMORE—By Dr. C. A. Schenck 34

THE LOCUST TREE 37

THE BLACK-KNOT OF WILD CHERRY—By Prof. Byron Halsted 39

TREE NAMES, PART II—By Prof. Ferris W. Price 40

THE TEREDO, OR "SHIP WORM"—By F. Roth 43

THE CULTIVATION OF WILLOWS IN NEW JERSEY 44

LETTERS RELATING TO THE PALISADES:

THE PALISADES PARK—By B. E. Fernow 45

A RESIDENT'S OPINION—By W. S. Vanderbeek 46

WHY THE PALISADES OF THE HUDSON OUGHT TO BE PRESERVED BY THE NATIONAL GOVERNMENT—By H. D. Winton 47

NOTE CONCERNING THE VITALITY OF COPPICE GROWTH 47

EFFORTS TO PRESERVE THE FORESTS ALONG THE STREAMS OF THE MIDDLE ALLEGHENY MOUNTAINS 48

C. S. MAGRATH,
PRINTER AND PUBLISHER, 121 FEDERAL STREET,
CAMDEN, N. J.

"FOREST PLANTING"

A Treatise on the Care of Timber Lands and the Restoration of Denuded Wood Lands on Plains and Mountains.

By H. NICHOLAS JARCHOW, LL. D.

CONTENTS.

Part I. Forest Culture.

CHAPTER I.—Introductory Remarks.
CHAPTER II.—Importance of Forest Culture.
CHAPTER III.—Proportion of the Wooded Lands of a Country to its Total Area.
CHAPTER IV.—Relations of the Government to Forests—Protective Forests.
CHAPTER V.—Governmental Assistance to Forest Culture—Establishment of Forest Schools for Training Foresters.
CHAPTER VI. Forest Planting—Preparatory and Precautionary Measures.
CHAPTER VII.—Methods of Culture and their Success.
CHAPTER VIII.—Cultivation of the Soil.
CHAPTER IX.—Drainage and Irrigation.
CHAPTER X.—Selection of Trees.
CHAPTER XI.—The Various Systems of Forest Management.
CHAPTER XII.—Raising Forest Trees by Natural Reproduction.
CHAPTER XIII.—The Collection and Treatment of Seeds for Forest Trees.
CHAPTER XIV.—Raising Forest Trees by Artificial Reproduction—A. Seeding.
CHAPTER XV.—B. Planting.
CHAPTER XVI.—The Care of Young Plantations.
CHAPTER XVII.—Protection of Forests Against Animals and Elemental Forces.
CHAPTER XVIII.—The Conversion of the Wild or Natural Woods into Cultivated Forests—What the American Forester Should do Next.

Part II. Forest Planting on Plains.

CHAPTER I.—Forest Planting on Lands with Alluvial Soil.
CHAPTER II.—Forest Planting on Marshy or Swampy soil.
CHAPTER III.—Forest Planting on Moorlands.
CHAPTER IV.—Forest Planting on High Moors.
CHAPTER V.—Drainage.
CHAPTER VI.—Burning Over the Soil for Cultivation.
CHAPTER VII.—Forest Planting on Sand Wastes or Pine Barrens.
CHAPTER VIII.—Forest Planting on Inland Sand Drifts.
CHAPTER IX.—Covering Downs or Sand Dunes on the Sea Coast with Trees and Shrubs, with Diagrams.

Part III. Forest Planting on Mountains.

CHAPTER I.—The Object of Covering Mountains with Forest Trees.
CHAPTER II.—Selection of Trees—Replanting Forests on Mountains—Planting or Seeding.
CHAPTER III.—Restoring Denuded Woodlands on Mountains—Preparatory and Protective Measures—With Diagrams.
CHAPTER IV.—How to Arrest and Bind the Shifting Sand on Mountains.
CHAPTER V.—Replanting Forests on Mountains of the Sandstone Formation.
CHAPTER VI.—Replanting Forests on Mountains of the Limestone Formation.
CHAPTER VII.—Restocking Mountains Having Rocky Surfaces.
CHAPTER VIII.—Restocking Denuded Woodlands on High Mountains.
CHAPTER IX.—Concluding Remarks. 1. State Forest Nursery. 2. Forest School in the Adirondacks. 3. Forest Experiment Station. 4. Asylum for Game to Rest and Breed.

The late Professor of Mining-Engineering at Columbia College, New York, General W. P. Trowbridge, to whom the proofs of this book were sent for an opinion, wrote to the author the following lines: Dear Sir: I have read the proofs of your work on "Forest Planting and Forest Preservation" with great interest. Its publication will be a timely and valuable contribution to knowledge on a subject, which, in this country, is just beginning to receive the attention which its importance demands. Your book will be a hand-book of information, thorough and complete in every department of forestry. Its conciseness and clearness are such as readily to suggest details, the insertion of which would have made the work more voluminous, and thus less acceptable to the large class of readers whom it is desirable to reach at the present time.

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JOHN GIFFORD,
EDITOR,
MAYS LANDING,
N. J.

Mr. B. E. Fernow,
Chief of the Division of Forestry, Department of Agriculture.

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VOLUME II. MAY 1, 1896. No. 3.

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Edited by JOHN GIFFORD, Mays Landing, N. J.,
Assisted by NEWLIN WILLIAMS.

Important Notice.

The next meeting of the New Jersey Forestry Association will be held in Plainfield on the evening of May 21st. Mr. B. E. Fernow, Chief of the Division of Forestry, will deliver a lecture on forestry. Mr. Fernow is well known to the better class of Jerseymen, and is familiar with the forest conditions of this state. There will be an excursion to the Palisades the following day if the commttee can arrange it. All are very cordially invited to attend.

ANOTHER fire season has begun. Farmers are clearing land and burning meadows, and the number of trains through the pine woods to the seashore rapidly increases. Black clouds of smoke rising here and there out of the woods produce a feeling of uneasiness among the owners of woodland and berry bogs. The majority of the natives look upon it, however, more as one of the signs of spring, as they would the flight of a flock of migrating geese, than a lamentable calamity to the whole community.

It is an opportune time to emphasize the fact once more that the first and most important step toward the prevention of fire is the construction of the proper kind of fire lanes through woodlands. All public roads and railroads should be converted into fire lanes. Instead of being a source of fire, as at present, they should act as lanes for the prevention of the spread of fire. Such authorities as B. E. Fernow, Gifford Pinchot and Dr. Charles Mohr, who have visited the Jersey pine lands, agree on this point. Many plans have been advised by those not familiar with the ground. It is useless to talk of the removal of the underbrush.

The forest fire is positively not a necessary evil, and it is a lamentable fact that so much time and hard work have been wasted in fighting fires when the same amount of labor expended at the proper time in constructing the proper kind of fire lanes would have been many times more fruitful.

I regard the forest as a heritage, given to us by nature, not for spoil or to devastate, but to be wisely used, reverently honored and carefully maintained. I regard the forest as a gift intrusted to us only for transient care during a short space of time, to surrender to posterity again as unimpaired property, with increased riches and augmented blessings, to pass as a sacred patrimony from generation to generation.—*Baron Ferdinand von Mueller.*

Forestry at Biltmore.

From the Southern Lumberman.

BILTMORE, N. C., March 1, 1896.

A number of months have passed since I promised to give you a description of the work going on at Biltmore, on the estate owned by Mr. G. W. Vanderbilt. I suppose you know that Mr. Vanderbilt, upon the advice of Mr. Gifford Pinchot, consulting forester, New York City, was public spirited enough to try practical forestry, in order that from the result of such "forest management" conclusions might be drawn as to the practicability of introducing forestry at the present time and under the present condition of the lumber market in the United States.

The experiment was begun on a small scale, in 1891, upon an area covering about 3600 acres, where improvement cuttings were started with a view to improve the quality of the forest, whilst at the same time drawing a net revenue from the sale of firewood and lumber. The experiment was made under adverse circumstances, from the fact that the forests had been lumbered for years, so that the number of good logs was very limited. A portable saw mill (circular) was used, and not more than about 200,000 feet of lumber were sawed up annually; for which amount, however, there was a ready market around and on the estate.

At present the forestry department cuts about 2000 cords of firewood per annum in Biltmore forest, one-half of which wood is driven down the French Broad River to Asheville. In this town the department does not find any difficulty in disposing of it with a small profit, while the other half of the annual cut is consumed by people living on and around the estate. The improvement cuttings were done in a very careful way, for the benefit of the second growth, which was and is expected to shoot ahead after the removal of the overshadowing old trees.

Many Americans used to be under the impression that forestry and tree planting are the same business. In this they are entirely in error. No reasonable forester would plant in a climate and under conditions where nature regenerates abundantly. The forester's work is to draw the greatest advantages from the gifts of nature by doing the fellings in such a way as to promote and protect the young growth of those species which will be of the most value in the future. In fact, the forestry department has not made any plantations on the Biltmore estate for forestry purposes. It is true there were about 50 acres planted in the Spring of 1895 with an indigenous species. But this planting was meant partly for landscape purposes, partly in order to investigate into the rate of growth of such species. In connection with the arboretum planned on the estate, there will be allotted to such investigations an area of about 150 acres, on which the woody species of the world, which are likely to grow in this climate, will be planted, and in the course of time their value as timber trees ascertained. That I may not be misunderstood, I repeat that all this planting is done, not for the sake of practical forest management, but for the development of forest science.

While the forestry going on near Biltmore, on the area mentioned, is mere child's play, the experiment of combining forestry and lumbering has been begun on a larger scale of late, on the mountain tract owned by Mr. Vanderbilt in Transylvania County, N. C., about 20 miles distant from Biltmore. This tract, which is called "Pisgah Forest," covers about 100,000 acres, and is fairly well stocked with poplar, chestnut, white and red oak, hemlock, hickory, etc.

As far as my information goes, there are about 80,000,000 feet of lumber on this tract which are fit for logs. The district is drained by a number of rivers and creeks, all of which are tributaries of the French Broad River, which passes in its lower course near Asheville. It is there that the lumber mill which Mr. Vanderbilt recently purchased is located. This mill has a daily capacity of 30,000 feet. In the boom connected with the lumber mill, the logs driven down from Pisgah district are caught.

The task to be accomplished by the

forestry department in this case is to get the lumber out of the district in such a way as to start a second growth of the most valuable species, such as poplar, white oak, red oak, chestnut and hickory; not to cut more per annum on an average than you may expect to reproduce, by the increment of the growing stock. In this way the mountain district will be a permanent source of revenue, as the department expects that 3,000,000 to 4,000,000 feet of lumber are "grown" annually, by a certain number of young trees reaching the size of lumber trees and by the increment of those that have attained such size already.

About one-half of the total area consists of poor ridge land, producing nothing but a scrubby growth of chestnut and chestnut oak, or showing no growth at all. This part, of course, is excluded, not from forest management but from lumbering. For this part the proper plan is "leave it alone." All we can do is to protect it from fire. The mere existence of these woods on the ridges, however, is beneficial to the woods lower down in the coves of the valleys, as they act as a sort of reservoir, preventing the rainfall from rushing down into the valleys, retaining it in the soil or vegetable mould produced by the annual shedding of leaves, whence it slowly trickles down to the coves and creeks.

Let us have a short look at the manner in which the present cuttings are conducted.

All trees to be felled in the winter are marked in the preceding fall, so that the department can make sure of the output from the different coves, and provide the necessary arrangements for cutting, snaking and hauling. Not every tree is marked that might do for lumber. Younger trees, of vigorous growth, which at the present time would not do but for one-third grade log each, are spared in order to lay on increased increment and to seed the ground. The cutting is done by day laborers, under the supervision of Mr. C. L. Whitney, a trained practical forester. In felling the trees, the first object, of course, is not to break the logs, and the direction in which the trees are felled mainly depends on this; besides, due attention is given in felling a tree to facilitating "snaking" of the logs. The only new thing in the felling is, that combined with these two objects, the regeneration of production of a second growth from self-sown seed is looked after. At the same time the trees are felled in such a way as to damage the young growth already present around them as little as possible. Where young trees happen to be bent down under the weight of the crown of a tree felled they are straightened out at once. I do not think the care which the department took to preserve the young growth increased the cost of cutting considerably. The cost of cutting averaged 47 cents per thousand feet. The hauling was done under contract.

I enclose one of the blank forms of contract, thinking it may be of interest to you. You will see from this how the department took care of the existing young growth. By paragraph four of the agreement the contractors are prevented from pasturing their cattle, etc., by condition six, they were prohibited from doing any "unnecessary" damage to the young growth, and especially from being careless with fire. In making the snaking roads, the contractors were not allowed to use just the most promising young trees of chestnut, poplar, hickory, oak, etc., for poles. The contractors were not allowed to cut standing trees for firewood, but had to use for fuel the "laps" of trees felled for lumbering purposes. Comparatively heavy fines for violations of the conditions of the contracts were laid down. No fines, however, have had to be imposed so far. In fact, it was more easy than the department supposed to get the contractors to understand the difference between forestry and ordinary lumbering.

No trees were marked and cut except those fit for logs. Of course in many cases it would be a blessing to a group of young and promising trees to remove an old tree containing no lumber, which is overshadowing them and preventing their development. The department thought fit to postpone such cuttings

until the financial results of the present manner of management is ascertained; forestry that does not pay is not forestry. On the other hand, the cover overhead is sufficiently opened out by the present feelings to furnish the young seedlings and saplings and poles, taken as a whole, enough of the food which they want, light, air and rain. After a number of years' cuttings will be made over the same localities once more, where they are taking place now, freeing the second growth, which is expected to be developed thereby in the meanwhile, from its suppressors, and taking off those trees which are then fit for logs. This you might call forestry. The sacrifice incurred by not moving every decent tree at once, and by cutting down some nasty, spreading trees for the benefit of the young growth overshadowed by them, is smaller than one might imagine upon a cursory view of the matter. A close view will even show that it is no "sacrifice" to use a part of the possible income to start the young growth. It is merely adding part of the interest to the capital invested. You might call such interest "latent" interest, as it is not shown by the annual balance as such.

Forestry is systematic lumbering, and the basis of the system is an accurate knowledge of the forests. For this reason something like a working plan should be prepared, based upon tallies taken all over the tracts and on a map of the country, and showing what will probably be done within the next score of years. This working plan should have elasticity enough to be changed, if the conditions change under which and for which it was made. The department so far has only made a preliminary working plan, by which it is provided that cuttings shall be run over the entire district in the course of the next twenty years, so that after the lapse of that period the axe will have returned to the place at which it began.

Previous to Mr. Vanderbilt's purchase fire used to burn over hundreds and thousands of acres in this district annually, and everywhere the woods show traces of forest fires. The lack of young growth of poplar is partly due to their ravages. At the same time herds of cattle were allowed to roam over the entire district, and the young growth has been constantly nibbled by them. At present there are three rangers and two assistant rangers protecting the district from fire and keeping out the cattle and pigs. The department may well be proud of the success it has so far achieved in this direction, as the cases of damage by fire or cattle are scarce now.

These guards should be lumbermen, as well as rangers, so that they might be put in charge of the lumbering during winter. Under their supervision a series of trails will be built, which will facilitate the exploration of the woods and protection from fire and cattle. In the present instance the owner will combine with the protection of the forest the protection of game and fish.

The department is unable to give any full information as to the financial result of the operations, which, of course, is the most interesting question in the matter. Every business man knows that a new business is less apt to pay than one which has profited by the experience of a number of years. I expect that the net revenue will amount to about 2½ per cent. of the capital invested, after deducting all the expenses, such as salaries, taxes, etc. This is certainly a small percentage, but considering that part of the interest is kept "latent," as shown above, and considering that the value of woodlands in this country is increasing every year, I think this result should be considered satisfactory for the first year of forest management.

Under usual lumbering, the whole tract would be lumbered out within about 10 years, giving an annual revenue of, say $10,000—and after a period of "fat years" there would follow a long, long number of "lean years." Under forest management there is—generally speaking—cut not more per annum than there is produced. The annual revenue may be only $5,000; it will, however, continue not only for 10 years, but as long as lumber is needed by man; it will continue forever.

These figures, of course, are open to criticism, and only meant to give an example, illustrating the conditions and expectations under which forest management pays better than the usual "exploitation" of timber lands.

It has been stated before that the capacity of the French Broad Mill, owned by Mr. Vanderbilt, is 30,000 feet per day, or 10,000,000 feet a year, whereas the annual output of the Pisgah forest will amount, on an average, to not more than three or four million feet per annum. Of course the department wishes to run the mill at full capacity, and in order to supply the deficiency has made arrangements to buy logs along the French Broad River and along the several lines of the Southern Railway. The French Broad Mill will be opened in the beginning of April, and it will have the honor of sawing up the first lumber which was cut under American forest managemeut. —Dr. C. A. Schenck, in the Southern Lumberman.

The Locust Tree.

BY JOHN GIFFORD.

From the Philadelphia Ledger.

The locust tree most commonly grown is known to botanists as Robinia pseud-acacia. It is called also black locust, yellow locust, false acacia and Indian bean.

The genus Robinia was named in honor of Jean Robin, a French botanist, once herbalist to Henry IV of France. The specific name, "pseud-acacia," means, of course, "false acacia," while the term "acacia" is from the Greek, meaning "sharp," referring, no doubt, to the thorns with which the acacias are often abundantly supplied.

The common locust belongs to the famous order, Leguminosæ, commonly called the bean or pulse family, which includes many trees, shrubs and herbs which yield food, timber, fibre, gums, dyes; in fact, a host of useful products.

In this region there are few trees belonging to the leguminosæ, the commonest, most interesting and useful of which is the common locust. Because of an insect pest this tree usually presents a very forlorn appearance. Its beauty is spoiled by dead branches and a lack of symmetry in consequence. When free from blemish its shape is graceful and its foliage delicate.

Many trees and shrubs of this family are able to endure very adverse conditions, often growing alone in desert regions. The foliage of several species has developed to suit the exigencies of arid places, and, although nutritious and relished by herbivorous animals, is usually protected by many thorns. The leaves of several trees of this order are used for fodder, although those of one species of mimosa, called in the West Indies "jumbai," causes the hair to drop out of the manes and tails of horses.

Besides a tap root, the common locust has an extensive horizontal root system. It has an advantage over the majority of trees and easily adapts itself to almost any kind of soil. It is excellent for planting along embankments and in similar situations to hold the soil in place. Besides this it reproduces itself rapidly by means of stoles or root suckers.

The locust holds the same relation to the tree world as does clover to field crops. Although it grows very rapidly on sterile soils, its ash is richer than that of the majority of hard wood trees. It seems paradoxical for a tree to grow with rapidity in a sterile soil, and at the same time produce one of the most durable woods known, and an ash richer in inorganic constituents than that of many other hard woods. Furthermore, it grows with remarkable rapidity. It is difficult to reconcile these facts: A rapid grower, a sterile soil, a rich ash, a durable yet light and elastic wood.

A careful examination of the rootlets of the tree partially solves this mystery. It at the same time furnishes an attractive field for further investigation and food for reflection.

Microbes, although the cause of many diseases, are indispensable even to the farmer. By their fermentative action fertilizers become available to the plant, and, in the form of bacteroids, on the

roots of clover and other leguminous plants they are constantly at work improving the quality of the soil. In view of the destruction occasioned by mankind, it is a consoling fact that nature, although slowly, is gradually improving her waste or wild lands. If not interrupted by the carelessness or maliciousness of mankind, the barest rock and fallowest field become in the course of time forest-clad and fertile. Not only are the roots of the locust bringing the inorganic substances from the deeper layers of the soil and depositing them in the leaves on the surface, but also through the aid of these mysterious bacteroids conserving rich nitrogenous materials. It is one of the strangest phenomena of the vegetable world. These microbes reside in little tubercles in the roots. They are able, in some way, to capture nitrogen for the plant upon which they are located. Nature by her smallest agents accomplishes her greatest work.

When the farmer grubs and trims the thorny, indomitable locust suckers from his fence rows he is killing the goose that lays the golden egg. A grove of locusts enriches the soil as does a field of clover.

The wood of the locust is famous the world over. For posts it has no equal among the common woods. Its peculiar color ought to recommend it for decorative purposes. It is usually greenish-white, shading into a reddish-yellow heart-wood. It is claimed by some that it contains a poisonous substance which causes sores on the hands of those who handle it. Although not belonging to the heaviest class of timber, it is one of the hardest and most elastic. It is, therefore, excellent for cartmaking, agricultural implements and hundreds of other uses to which it has never been put. It is prized above all other woods for long wooden pegs. The timbers of many ships are held together by these tough, elastic and durable pins.

The locust tree is tall, slender and somewhat irregular in shape. When planted around fields its shade will not seriously interfere with crops. The bark of the locust is of a peculiar grayish-yellow color, rough, and in old trees deeply furrowed. Each leaf consists of from 9 to 19 small, oblong-shaped, thin, entire leaflets. The twigs are purplish-brown in color and smooth. The flowers are white, the shape of the pea flower and fragrant. They are clustered in hanging racemes from three to six inches in length. It flowers in May and June. Some trees have thorns, others do not. The fruit is a pod, in which several small, dark-colored, bean-shaped seeds are contained. It usually bears a large quantity of fruit. The seeds may be bought at 50 cents a pound, and when scattered over a loose soil, with a slight covering, germinate in about two weeks.

Figures tell what may be done with the locust. There are many abandoned farms in the East which can be bought for two dollars an acre. Two hundred acres of land will cost in the neighborhood of four hundred dollars. Twenty-five dollars will buy more than enough locust seeds. Fifty dollars more will plough and sow it. Thus for about five hundred dollars two hundred acres may be bought and planted in locust. In twenty years it ought to yield 20,000 trees, each of which ought to make four posts, and each post will be worth not less that fifty cents. The result of such a calculation almost startles one, as it amounts to $40,000; in other words, a small fortune. The above is, of course, only a rough estimate. Each tree is allowed 435.0 square feet.

The locust is well adapted for planting along pine woods through which lines of railway pass, and where there is constant danger of the soil covering of dead pine leaves being ignited by sparks. Planted in a single row along railroad lines they would fix the soil of embankments and cuttings, and would add to the beauty of the landscape; would act as a screen in preventing sparks from flying to more inflammable trees, and they would yield excellent material for ties and other purposes of the road when a strong yet elastic and lasting wood is needed.

Unfortunately, this tree is infested by borers. The most troublesome borer to the locust is *Cyllene Robiniæ*. The

trunks and large limbs are sometimes completely honey-combed by this insect. If these trees are watched in August and September, one is likely to find handsome brown and yellow banded wasp-like beetles laying oval, dull white eggs in crevices in the bark and in wounds.

In about ten days these eggs hatch and the larvæ bore into the tree. They are still small by winter, during which time they are dormant in the wood. In the spring they begin to bore until about August, when they stop feeding and enter the pupæ stage, and a week or so later appear as full-sized beetles.

These beetles live upon the pollen of the golden rod, and are, perhaps, instrumental in aiding the fertilization of this beautiful plant, which is everywhere abundant at that time. All golden rod near the locust plantation should be cut and burned. The beetles should be destroyed whenever seen, since they are easily captured. The beetle usually infests only the outermost trees in a large plantation. It can be successfully combatted by the use of a soap made of lye, fish-oil and water. This should be applied just before she begins to lay her eggs.

A smaller borer infests the twigs of the locust. In summer remove the twigs and burn them.

In spite of enemies, the locust is a profitable tree and deserves to be more extensively planted. Every up-to-date farm should have a well-cared for wood-lot. This wood-lot should be arranged so that it will supply the farmer with a great variety of useful materials. He needs wood for fuel, which, when burnt in the proper kind of fire-place, makes the cheapest, healthiest and cheerfulest kind of fire—maple is good. He needs soft wood for boards and shingles—white pine and white cedar are good. He needs rails—chestnut is good. And above all he needs good fence posts. For that purpose the common locust has no equal.

The Black Knot of Wild Cherry.

A correspondent who is deeply interested in the forests of New Jersey asks if the knots upon the limbs of wild cherry trees are contagious. This seems at first sight like a silly question, but so do most questions to most people.

Let us look into the nature of these excrescences. The knot forms slowly upon the cherry limb and may be several years coming to the size met with upon many stems. At first the limb swells a little and begins to crack lengthwise, and by the end of the first year a dark somewhat mulberry surface is developed. Insects of various kinds find the juicy young knot favorable for feeding and breeding, and therefore it is rare to find a knot without insects infesting it. This general presence of insects led to the belief that the knots were the result of insects; on the other hand the insects are present because of the knot.

The knot is undoubtedly due to a fungus that grows within the living tissues of the stem and produces a knot in much the same way that the corn smut fungus changes the grains to a dark mass many times the normal size of the grain. The spores of the black knot fungus, (*Plowrightia morbosa* (Schw.)) fall upon the surface of a young twig and there grow, and finally the knot results. The same species of fungus produces knots upon several kinds of cherry and plum, the following being attacked: *Prunus serotina*, Eh., the wild black cherry; *Prunus Pennsylvanica*, L., the wild red cherry; *Prunus Virginiana*, L., the choke cherry, and three wild plums, namely, *P. Americana*, Marsh; *P. Maritima*, Wang, and *P. Chicasa*, Michx. Whenever one of these species is infested all others near it may be expected to bear the same parasite. This answers the question with which we started, and in the affirmative. The black knot is a malformation upon the genus Prunus caused by attacks of the fungus *Plowrightia morbosa* (Schw.), and the spores produced in great numbers by one knot may find lodgment upon the young branches of other plum or cherry trees and there develop new knots.

If this fungus confined its ravages to the wild species of Prunus the case would not be so alarming, but it comes into the

orchard and does serious demage to both cherry and plum trees. From the fact that the trouble is contagious it is clear that any one who is suffering from these knots in his orchard should not look with favor upon wild plants near by that are loaded with galls.

For orchard treatment nothing better has been found than cutting off and burning the knots. It goes without saying that to get clear of the pest in the orchard the same remedy should be applied to the hedge row and forest knot bearing species of the genus Prunus.

BYRON D. HALSTED.

New Brunswick, N. J., April 2, 1896.

II.—Tree Names.

BY PROF. FERRIS W. PRICE.

NATURAL ORDER, CUPULIFERAE.

Cū-pū-lif'-e-rae (L. anal.) species bearing little cups,—referring, of course, to the cup-like involucres investing the nut.

Tribe I.

Bĕ-tū-lē-ae (L. anal.) birch-like species.

Genus 1.

Bet'-ū-la [ū quickly pronounced] (L.) the ancient Roman name of the birch, the origin and meaning unknown. Perhaps, it was derived from or related to the Celtic name.

Birch is from the Anglo-Saxon. Possibly, the original meaning was "bright, white, shining" (Cent. Dict.)

Species 1.

len'ta (L.) flexible, but tough (not *soft*, as Loud. says.) This word was often used by the Romans in connection with the names of the vine, willow and other species.

The popular names *Cherry Birch* and *Sweet Birch* need no explanation for any one familiar with the aromatic bark and general appearance of this species.

Species 2.

lū-tē-a (L.) golden-yellow (applied by Pliny the naturalist to the yolk of an egg.) The bark is sometimes "yellowish-gray" (G.), whence the popular names *Yellow Birch* and *Gray Birch.*

Species 3.

pŏp-ū-li-fò-li-a [ū quickly pronounced] (L. anal.) having poplar-like leaves. This is not only true of the shape, but of the constant quivering motion so noticeable in *Populus tremuloides.* The common names *White Birch* and *Gray Birch* are evidently appropriate. The common European species is *B. alba*, whence by way of distinction our tree is sometimes called *American White Birch.*

Species 4.

păp-y-rif'-e-ra (L.) yielding papyrus, or paper. The bark of this species readily splits into thin sheets, whence the name *Paper Birch.* The name *Canoe Birch* is obviously due to one of its uses among the Indians and frontiersmen.

Species 5.

nī-gra (L.) black, or dark. Although not black, the bark is certainly quite dark in comparison with the preceding species. Its favorite place of growth is on "the banks of streams" (G.), whence the name *River Birch.* The new growth has a decided reddish hue, whence the name *Red Birch.*

Species 6.

pū-mi-la (L.) dwarf,—of obvious application.

Species 7.

glăn-dū-lò sa (L.) glandular,—referring to the glandulous excresences with which the branchlets are dotted. *Dwarf Birch*,—this species is even smaller than the preceding.

Genus 2.

Al'-nus (L.) the Roman name for the alder. The words *Alnus* and *alder* are certainly related to each other, and both appear to be derived from a wide-spread Indo-Germanic root, which perhaps meant originally *grow.* Loud., as in the case of so many tree names, suggests that *Alnus* is of Celtic origin.

Species 1.

vir'-i-dĭs (L.) green,—being leafy at flowering time, thus remarkably dis-

tinguished from the two following species. *Mountain Alder*,—from the habitat.

var. sĭn-ū-à-ta, — "sinuate-toothed," (G.)

Species 2.

ĭn-cà-na (L.) hoary,—referring to the leaves, whose under surface is usually covered with white down.

Species 3.

sĕr-rū-là-ta (L. anal.) serrulate,—though the leaves are not more conspicuously serrulate than are those of A. incana. *Smooth Alder*,—the leaves are mostly smooth,—at least not hoary.

Species 4.

mă-rit'-i-ma (L.) growing by the sea.

Tribe II.

Cŏ-ryl'-ē-ae (L. anal.) hazel-like species.

Genus 3.

Cor'-y-lus (L.) the Roman name of the hazel. The words *Corylus* and *hazel* are believed to be etymologically related, different as they are in form. The original meaning of this old root is unknown.

Hazel is from the Anglo-Saxon. Loud. mentions the fact that there is an Anglo-Saxon word meaning *head-dress*, with which the name of our plant may be connected,—the conspicuous involucre suggesting the comparison.

Filbert was formerly spelled *philibert*. S. suggests that this may be connected with a St. Philibert whose "day is Aug. 22 (Old Style) just the nutting season." Similarly, a filbert is now "called in German *Lambertsnuss*,—Lambert's nut; St. Lambert's day is Sept. 17th." (S.) The word *philibert* is derived from two Old High German words meaning *very bright*.

Species 1.

A-mĕr-i-cà-na (L. anal.) American.

Species 2.

rŏs-trà-ta (L.) beaked,—so-called, of course, on account of the remarkably prolonged involucre.

Genus 4.

Os'-try-a (Gr. and L.) the ancient Greek and Roman name for "a tree with hard wood, perhaps the hornbeam" (Andrew's Lat. Lexicon.)

Hornbeam and *Iron-wood* both have reference to the hard-wood. In the case of *Hornbeam*, the whiteness of the wood is thought of. The name *Lever-wood* is probably also connected with the hardness of the wood.

Hop Hornbeam—because the fruit of Ostrya bears considerable resemblance to that of the hop.

Species 1.

Vĭr-gin'-i-ca (L. anal.) Virginian. The same remark applies to this specific name as to *Virginiana*. See Juniperus Virginiana.

Genus 5.

Căr-pi-nus (L.) the Roman name for a tree of this or some allied genus. Loud. suggests that *Carpinus* is connected with a Celtic word for *yokes of cattle*.

Species 1.

Căr-ō-lī-ni-à-na (L. anal.) belonging to Carolina (?) perhaps because first reported from that section; though really its geographical range is very extensive.

Blue or *Water Beech*—the bluish-grey bark and the straight-veined leaves suggest the beech.

Tribe III.

Quĕr-cin'-ē-ae (L. anal.) oak-like species.

Genus 6.

Quer'-cus (L.) the Roman name of the oak, especially the *Italian Oak*, Quercus Esculus.

Quercus is akin to the English *fir*, though the trees designated are so different. "The original meaning of the root was probably *hard* or *firm*." (S.) Andrew's Lat. Lexicon quotes an ancient authority who accounted for the etymology in the same way.

Oak is an old Teutonic word, root and meaning unknown.

Sub-Genus 1.

Leu-cō-bal'-a-nus [*Leu* like *Lu*] (G. anal. in Latinized form) white-acorned.

Species 1.

al′-ba (L.) white, referring probably to the "pale bark" (G.) and the glaucous under surface of the leaves.

Species 2.

stĕl-là-ta (L.) set with stars, or sometimes star-shaped. In the present case it probably refers to the "stellular or fasciculate pubescence" on the leaves. (Darlington's Flora Cestrica.)

Post Oak and *Iron Oak*, "very durable wood" (G.); "much valued for posts." (Darl.)

Species 3.

măc-rō-car′-pa (G. anal. in Latinized form) large-fruited. This and the popular names, *Burr Oak*, *Over-Cup* or *Mossy-Cup Oak*, are all due to the size and conspicuousness of the involucre, and its awned scales.

Species 4.

ly-rà-ta (G. and L. anal.) lyrate-lobed.

Over-Cup Oak,—"involucre almost *covering* the acorn" (G.)

Species 5.

bic′-o-lor [in English probably bī-col′-or] two-colored. The propriety of this name is not obvious. The under-surface of the leaves is sometimes "whitish, or cinereous, sometimes pale olive, or greenish ferruginous" (Darl.)

Species 6.

Mi-chaûx-i-ī [Mē-shō-si-ī] Michaux's,—belonging to or associated with Michaux, the great French botanist and traveler of the last century, who studied and named many American species.

Basket Oak,—"especially suited to basket-making." (Cent. Dict.)

Species 7.

Prī-nus (G.) the Greek name of the *holm-oak*, *Q. ilex*, whose leaves are sometimes not very different from our species.

Chestnut Oak,—on account of the general resemblance of the leaves to those of the chestnut,—even more noticeable in *Q. Muhlenbergii*.

Species 8.

Mūhl-en-ber′-gi-ī (L. anal.) Muhlenberg's,—belonging to or associated with Muhlenberg.

Yellow Oak,—possibly on account of the "yellowish green" leaves. (Darl.)

Species 9.

prī-noi′-des [prī-noy′-deez] (G.) resembling *Prinus*. Sometimes called *Chinkapin Oak* (Cent. Dict.)

This name is naturally suggested by the similarity of our species to the common *Chinkapin* (or *Chinquapin*) in size.

Species 10.

vī-rēns (L.) verdant, fresh and green. This and the common name *Live Oak* refer of course to the fact that the leaves are evergreen.

Sub-Genus II.

Mĕl-an-ō-bal′-a-nus (G. anal. in Latinized form) black-acorned.

Species 11.

rū-bra (L.) red. "The leaves turn dark red after frost." (G.)

Species 12.

cŏc-cin′-ē-a (L.) scarlet. "So named from the color of the leaves in autumn." (Cent. Dict.)

var. tĭnc-tò-ri-a (L.) belonging to dyeing. *Quercitron* is derived from *Quercus* and *Citrus*, the latter being the name of the genus to which the *lemon* belongs. The name *Quercitron* was probably given originally to the yellow bark, which yields a useful dye,—afterwards to the tree.

Yellow Oak and *Black Oak* also refer to the bark, which is *dark* externally with *yellow* interior.

var. ăm-big′ū-a (L.) doubtful,—referring of course to its name and classification.

Species 13.

pă-lus′trĭs (L.) marsh-growing. *Pin Oak*,—"in allusion to the persistent dead branches which resemble pins driven into the trunk." Cent. Dict.

Species 14.

făl-ca-ta (L.) scythe-shaped,—referring to the lobes of the leaves, "particularly the terminal one." (G.)

Species 15.

ĭl-i-ci-fō-li-a (L. anal.) holly-leaved,—though the resemblance is not very great.

Bear Oak,—"acorns said to be

greedily eaten by *bears*, deer and swine." (Wood's Botany.)

Scrub-Oak is sufficiently accounted for by the dwarf, straggling habit.

Species 16.

a-quat'-i-ca (L.) associated with water, from its habitat in wet ground and by the borders of ponds.

Species 17.

nī-gra (L.) black or dark. *Barren Oak*, —from the habitat. *Black Jack Oak*,—"a *small*, gnarled tree with *dark*, massy foliage." (Wood's Botany). *Jack*,—sometimes used adjectively to designate something diminished in size." (Wb.)

Species 18.

ĭm-brĭ-cà-ri-a (L. anal.) pertaining to gutter-tiles,—or perhaps *shingles*, referring to an early use of the wood. (G.) *Laurel Oak*,—on account of the elongated, entire leaves.

Species 19.

Phel'-lŏs (G.) the Greek name of the *Cork Oak*, *Q. suber*,—probably on account of some similarity in the leaves.

Willow Oak,—on account of the shape of the leaves.

Hybrids.

trī-dĕn-tà-ta (L. anal.) three-toothed.

hĕt-er-o-phyl'-la (G.) with variable leaves.

Genus 7.

Căs-tà-nē-a (G. and L.) the ancient name of the chestnut, derived, it is believed, from the name of a Greek city near which it was abundant. Our word *chestnut* is derived from a form *chesten-nut*. Chesten is certainly only a corruption of the old Latin *Castanea*,—as is shown by a large number of intermediate forms found in French and English. Some of these are *castane*, *castayne*, *chastayne*, *chesteyne*, *chasten*. See Murray's Dictionary.

Species 1.

sa-tī-va (L.) planted,—i. e., cultivated, as is the case with the European form of the species.

pù-mi-la (L.) dwarf. *Chinkapin* (or *Chinquapin*). a corruption of the Indian name.

Genus 8.

Fà-gus (L.) the Roman name of the beech.

Beech is from the Anglo-Saxon, and is perhaps related etymologically to *Fagus*,—from an original Aryan root meaning *eat*, possibly referring to the edible fruit. (L.)

Species 1.

fĕr-rū-gin'-ē-a (L.) dark red, dusky. Enlarged involucres of the pistillate flowers "reddish ferruginous." (Darl.) Perhaps, however, our species was named from specimens with reddish foliage, variations in this respect being not uncommon, and familiar in cultivated forms.

NOTE.—To the list of abbreviations already given should be added the two following:
Darl., Darlington's Flora Cestrica (1837.)
Wood, Wood's Class-Book of Botany.

A Few Facts About the Teredo, or "Ship-Worm."

BY FILIBERT ROTH.

Every year enormous quantities of piles and wharf timbers, besides the bottoms of thousands of ocean crafts of various sizes are destroyed by the "ship-worm" and require renewal.

Usually the cost of the timber or planking is but a small part of the entire damage since the repairs frequently involve large superstructures and necessitate costly methods.

The damage is greatest in the tropics, but is often enormous in countries as far north as Great Britain and Holland.

The ship-worm or Teredo, which is the principal one of many kinds of these wood-destroying borers is not an "insect" as many would have it, nor is it a worm, but belongs to the class of the shell fish, like the clam and oyster.

When young, about the size of a mustard seed, its tiny shell covers the body just like that of a clam, the animal swims about, and soon attaches itself to any piece of wood it comes in contact with. It then bores its way into the wood, growing at the same time into a worm or snake-like form ½ to 1½ inches thick and 8 to 36 inches and more in length. The two valves of its

shell do not keep pace with this growth, and in the adult animal they cover only the end in which the vicera (heart and stomach) and the foot are located, and serve the animal as a rasp to bore its way through the timber.

The greater part of the worm-like body is composed of two tubes (siphons) which are united for more than half their length. Through one of these tubes the animal draws in the fresh water containing the little animalcules upon which it feeds, and the oxygen for its breathing (which it does by gills like a fish,) and through the other tube it ejects this water, and its excreta together with the finely ground wood pulp from its boring. Whether it gets any nourishment out of this pulp is as yet doubtful, and the boring seems made chiefly for the sake of a secure home. The hole or "boring" is lined with a thin coating of shelly matter; is rarely straight, often very crooked, usually following the grain, but avoiding the borings of other individuals, knots, nails, etc.

Since any one pile or timber is usually attacked by many individuals at once, the progress of destruction is very rapid. In Florida, at the end of three seasons, heavy pine piles 16–20 inches in diameter are sometimes completely ruined for several feet up and down, so that they fall under their own weight, and even the hardest of Australian timbers are destroyed in a comparatively short time. Palmetto, Sitka Cypress and Mangrove in our country, "Turpentine" (Syncarpia laurifolia), "Prickly Tea" (Melaleuca stypheloides), Jarrah (Eucalyptus marginata), besides other species have been pronounced as more or less Teredo-proof, but from a recent report by Messrs. J. H. Maiden and J. V. De Cogue, to the government of New South Wales it appears that none of the Australian species are invulnerable, and the same is true of our own.

To protect timber against the Teredo, covering with broad headed nails, and in recent times copper sheathing have been employed.

This latter has become the universal protection for the bottoms of all the costly ships, while copper, paint and cement is used for cheaper structures.

A series of inventions intended to furnish a more satisfactory protection have been patented in this country. Most of these are covers of asphalt and kindred substances mixed with sand, ground glass, etc., and several, it would seem would prove more expensive than the copper-sheath itself. Other inventions provide for disinfectants, in some cases to be applied continuously by filling holes in the piles with the particular substances. To those interested in this direction, the following may prove helpful.

1. No timber has as yet proven Teredo-proof.
2. The Teredo is most active in brackish water, less so in very salty and stagnant water.
3. Any protection must be cheaper than copper sheathing.
4. It must be mechanically resistant.
5. It must be unalterable by water, so that it continues to form a perfect surface cover.

The cultivation of the willow deserves attention in Southern New Jersey. There are many acres of bog land which are well adapted to that purpose. Great Britain alone produces 20,000 tons of willow withes annually on 8,000 acres of land. There is no doubt opportunity for the development of an important industry in this line in the southern part of this State. The species generally used for the purpose are the Osier or Basket Osier (*Salix viminalis*), the Laurel Osier (*Salix triandra*) and the Purple Osier (*Salix purpurea*).

The dreary monotony of the prairie, with oftentimes not even a tree to break the level sky line, is a great factor in breeding the melancholy that has not infrequently driven a woman raving mad. It is said to be not uncommon for lone sheep herders on the great plains of Australia, who often do not see a human being for months at a time, to go insane from the same cause.—*New York Sun.*

The Palisades Park.

U. S. DEPARTMENT OF AGRICULTURE, DIVISION OF FORESTRY, WASHINGTON, D. C.

March 19, 1896.

Editor *The Forester*.

Sir:—There is no more hopeful sign of the arrival of a more highly civilized condition in our communities than the movement for open spaces, for parks, for protection of historic or picturesque and interesting places, for reservations in general. It shows that we are passing rapidly from the pioneering stage, when everything is gauged by the direct usefulness, to the comfortable stage of settled conditions, when we can afford to pay tribute to our esthetic and pleasurable emotions.

This movement, while akin to the forestry movement, in that it is fed somewhat by the same desire of regulating the use of our opportunities with a view to permanence, is, however, entirely different from the latter in ultimate objects, and it is a mistake to mix up the two in such a fashion as to cloud the issues.

While it is true that parks, pleasure grounds and roadside planting have to do with arboriculture, the objects to be attained by these forms of tree growth are entirely different from those forms which we designate as forests. To be sure, pleasure and recreation, shade and beauty can be found in the wild forest just as well and sometimes perhaps better than in parks and under the lawn trees; but that is only an incidental service which the woods render us without our planning for it. The main service, the principal object of the forest, has nothing to do with beauty or pleasure. It is not, except incidentally, an object of esthetics, but an object of economics. Its usefulness in furnishing material or in serving as a soil cover to secure favorable soil and water or climatic conditions, or both is its *raison d'etre*.

I realize perfectly well that the sentiment which leads to the establishment of parks—an expression of our esthetic sense—can also be utilized and extended to secure the establishment of a rational treatment of our woodlands—an expression of our economic sense—but nevertheless they are not the same, and by muddling the minds of the people in regard to the two issues, we are apt to injure the progress in either direction.

The "forestry fad," if I may be permitted to refer by such a name to the rather hazy efforts of some well-meaning, but little informed people, has become rampant of late, and is used to forward all sorts of incongruous schemes, from the establishment of public flower beds and fountains to the creation of a national forest administration. The latest effort is expressed in the proposition coming from Buffalo, N. Y., to create a corps of "city foresters," meaning the men who are to keep the street trees trimmed and cared for in general. The name must have been invented to humbug the people into assent to the expenditure, which it should be possible to obtain on the simple representation of the need of the street trees.

Why not call a spade a spade? Why not use the English language with discrimination? Why not call a park a park and a forest a forest; the one for pleasure and recreation, the other for timber and protection; the one attended to by park commissioners and landscape gardeners, the other by foresters and loggers.

For the reasons stated, then, I do not see why the Palisades Park, to be created for the purpose of satisfying the esthetic sense of the people, should be called a forest, albeit a forest growth may be maintained in it, to satisfy that sense. If it is desired to indicate the character of the park, the designation Palisades Forest Park would answer, or else avoiding all doubts, why not adopt the plan of the city of Boston, which has named her several large forest parks simply Reservations.

I would favor the proposition of placing the park under military administration, for the simple reason that the military administration is the only permanently stable and systematic organization in our government, a matter of vital

importance to the development of a park, which always suffers by change of management. We shall then be assured of a well-ordered and well-kept establishment under efficient protection and care.

The War Department has experience in the management of such parks through the establishment of the various parks which commemorate the battlefields. It can when landscape art is required call for advice if necessary upon outside professionals.

As to the treatment, I have no doubt that the Boston municipal parks or reservations will furnish good examples to follow. But for the laying out of roads and paths and opening of vistas, nature will have to be largely allowed its course, with an occasional aid of the axe in improving the composition and development of the natural forest growth.

If the extent and character of the forest growth in this reservation be such as to render it useful also as an object in forest management in connection with a forestry school, I have no doubt that at the proper time and with proper presentation of the subject to the authorities in charge of the park, portions of it would be readily placed at the disposal of those who might carry out such an object lesson.

I fear, however, that the establishment of such a school is not among the immediate probabilities, and believe that when it comes, more promising locations could be found for it. Meanwhile, let us have the park as a park without clouding issues.

Yours truly,

B. E. FERNOW.

A Resident's Opinion.

ENGLEWOOD, N. J., April 7, 1896.

The Editor of the Forester, Mays Landing, N. J.

DEAR SIR,—Mr. Wetmore, of Englewood, transmitted to me a copy of your letter, requesting an expression of views as to what purpose the Palisades might be put. I have recently bought some land on the Palisades, and have considered a treatment and future for them, and also, being interested there, would like to express my views through the press. The opinion abroad of the situation of affairs with relation to the Palisades, is a mistaken one. It seems to be the idea of the people of New York, and of those not acquainted with this section, that the Palisades can be bought for about $500,000, including all of the tract within the boundaries described in the bill now before Congress. This is grossly in error, and the matter has been grossly misrepresented to Congress by the Commissioners appointed by the States of New York and New Jersey for investigating their condition. A gentleman who is well informed in regard to the value of property in that region, took the trouble to ascertain the selling price of the most of the property owners on the Palisades, *for the Commissioners*, also took them to the records in our County Clerk's office, and showed them the prices paid for land then extending back for a period of twenty-five years. The prices obtained, and the remainder of the land estimated at corresponding values, would have made the tract in question cost the Government four and one-half million dollars. It is worth a great deal more. It would be easy to understand that in view of that it would not be wisest to leave the Palisades forest in their natural state. Above Fort Lee there are not many dwellings on the cliff front, but what there are are very valuable residences. Progress has been slow there in the past, but recently a railroad has been projected to run through the section, and is already built for seven miles, with its present terminus at Coytesville, which, when it is completed, will make this region the most beautiful and desirable residential district on the wide earth. The views, both east and west, for the entire extent of the Palisades, are beautiful and magnificent in the extreme. Of course it is evident that it would only be by a slow and tedious process of legislation that the Government can be induced to undertake their purchase for park purposes. The people should, however, have preserved to them the free right of approach to the cliff front for its entire length, for all time, on account o.

its wonderful scenery and its intense interest as a natural curiosity.

In order to promote development of the region behind the reserve, there should be a boulevard built along the brink as conveniently as possible for an enjoyment of the river views, the grounds neatly laid out for park purposes, and vistas arranged for houses behind the reserve. I apprehend that this could all be accomplished with moderate cost to the State Government, and with great ultimate profit, by the following scheme: Let the Government condemn the land within the designated reserve for park purposes, and map a plan for a boulevard and park improvement, stipulating that the public should have the permanent use of the cliff front and the walks provided for their use, and reserving to the owners of the land the right to retain their land for occupancy, under the restriction that they should not mutilate or permit mutilation of the palisades precipice, and that they should not build any improvement on the land except as should be acceptable to Commissioners to be appointed for the management of the reserve.

I think that nearly all of the owners of land would prefer to retain their land in view of its prospective enhancement of value, and the taxable value of the land would be so much increased that an immense profit would accrue to the State out of this transaction.

WILLIAM S. VANDERBEEK.

Why the Palisades of the Hudson Ought to Be Preserved by the National Government.

1. It is of national interest, because it is one of the natural wonders of the world. A stretch of rock twelve miles long and varying in heigth from 250 to 550 feet, at the gateway of the Hudson.

2. It is the site of great historic interest. During the Revolutionary war Washington made it the headquarters after being driven out of the City of New York. Fort Lee was built to protect the river from the English, and can now be utilized for naval and military station if necessary. It is within sight of New York City, and the Government has found it necessary to purchase land within the neighborhood of large cities upon which to mobilize bodies of troops. Governor's Island, now the Governmental location is not accessable except by water.

3. The cost of purchasing the riparian rights, the water front and the land on top of the Palisades, say for one-quarter mile from the edge of the rocks, is too great for New Jersey and New York.

The State of New Jersey donates its water front towards the preservation of the Palisades and the creation of a National Park.

The State of New York donates all its water front, about 1½ miles on the river.

4. Palisades is within one-half hour journey of (4) four million people.

5. The Forest Reservations of the United States are 17 in number, estimated at 17,564,800 acres valued at $42,500,000, not an acre of which is in New York or New Jersey.

6. New York and New Jersey have paid to the National Government in customs and Internal revenue from 1886 to 1895, $1,558,244,459.79. More than one-third of the entire revenue of the Government during that time.

7. It is proposed to have appropriated $500,000, which together with the donation of the water front from New Jersey and New York will purchase sufficient ground for park purposes.

H. D. WINTON,
President Board of Palisades Commissioners.

Many of the farmers of North Jersey claim that the chestnut has "run out," meaning, of course, that its vitality has been reduced. The same seems so of coppice oak in South Jersey. This is no doubt the truth, since it is a law of nature that if any organism reproduces itself asexually for a very great length of time it degenerates. This is happening, it is claimed, to the Lombardy poplar, which was once in fashion as an ornamental tree. The majority of these trees look sickly, and, according to good authority, have lost their vitality because they have not been reproduced from seed.

MORGANTOWN, W. Va., April 3, 1896.

The West Virginia Academy of Science, heartily approving of the Commission of the National Academy of Science, appointed by the request of the Secretary of the Interior, to make inquiry and report on a forestry policy for the Government; and being interested in the protection of forests and headwater streams in the Middle Allegheny mountains, desire to contribute information and take action that will in any way aid in the advancement of forestry interests. The academy has therefore appointed a committee consisting of the following: Dr. A. D. Hopkins, Chairman; Dr. J. L. Goodknight, (President W. Va. University); Dr. John A. Myers, (Director W. Va. Agricultural Experiment Station); Judge Okey Johnson, (Dean of the Law Department, W. Va. U.), and Prof. L. C. Corbett (Professor Agriculture and Horticulture W. Va. U.), to inquire into the subject of forest protection, and draft bills for the establishment of a system of forestry reservations in the Middle Alleghenies, the bills to be submitted to Congress and the State Legislature.

By referring to a map it will be seen that there is an area in the Middle Allegheny mountains, principally in West Virginia, but extending through a portion of Maryland and Virginia, and into Pennsylvania and North Carolina, in which the source of a number of important rivers are found, namely: the Monongahela, with its tributaries; the Elk, Gauley, Guyandotte and Big Sandy, all of which belong to the Ohio River system; the principal tributaries of the Potomac and James, and also the source of the Tennessee River. In addition to this important system of river sources, the river embraces possibly a million and a half acres of virgin forest, with a considerable area of cut-over brush and waste land. Much of the continuous forest area lies in large bodies, and consists largely of black spruce, hemlock, white pine, and valuable hard wood timber, making it a region of extreme importance, not alone to the States in which it occurs, but to the entire region drained by the several rivers mentioned, embracing a large portion of the United States east of the Mississippi River.

It is therefore evident that the protection of the forests in this region is a matter worthy of consideration by the Secretary of the Interior, the Forestry Inquiry Commission of the National Academy of Science, the Rivers and Harbors Committee of Congress and the Representatives in Congress from West Virginia, to whom the accompanying resolutions are respectfully submitted.

The committee of the West Virginia Academy of Science will hold itself in readiness to furnish, as far as may be, any information regarding the region embraced in West Virginia, and will gladly co-operate with other Academies of Science, scientific and forestry associations and individuals, in obtaining and presenting facts bearing upon the subject.

A. D. HOPKINS,
J. L. GOODKNIGHT,
JOHN A. MYERS,
OKEY JOHNSON,
L. C. CORBETT,
Committee.

PREAMBLE AND RESOLUTIONS WITH REFERENCE TO THE PROTECTION OF FORESTS AND HEADWATER STREAMS.

WHEREAS, In consideration of the importance of the Middle Allegheny Mountain Region West Virginia, Pennsylvania, Maryland, Virginia and North Carolina, with its present forest covering in its relation to the protection of the numerous river sources of this region; the present rate of destruction of timber and other forest growth by the ax, fire and other causes now in progress, withort prospect of abatement, until the forest wealth is exhausted and its value as a protection for headwater streams and springs is lost, and

WHEREAS, In consideration of the disastrous results which are certain to follow the loss of the forest covering of this region, in the drying up of streams and springs, in the washing away of soils from the denuded mountain slopes, in destructive floods and detrimental climatic conditions, it is evident to us that the protection of the more important forest areas and headwater streams in this region, is a necessity, and should receive prompt attention; therefore be it

Resolved, That we, as members of the West Virginia Academy of Science, do urge upon Congress and our State Legislature the immediate, pressing necessity of establishing by law, such forest reservations and forestry policy as will succesfully prevent the evil effects of forest destruction in the Middle Allegheny Mountain region.

Appleton's
Popular Science Monthly.

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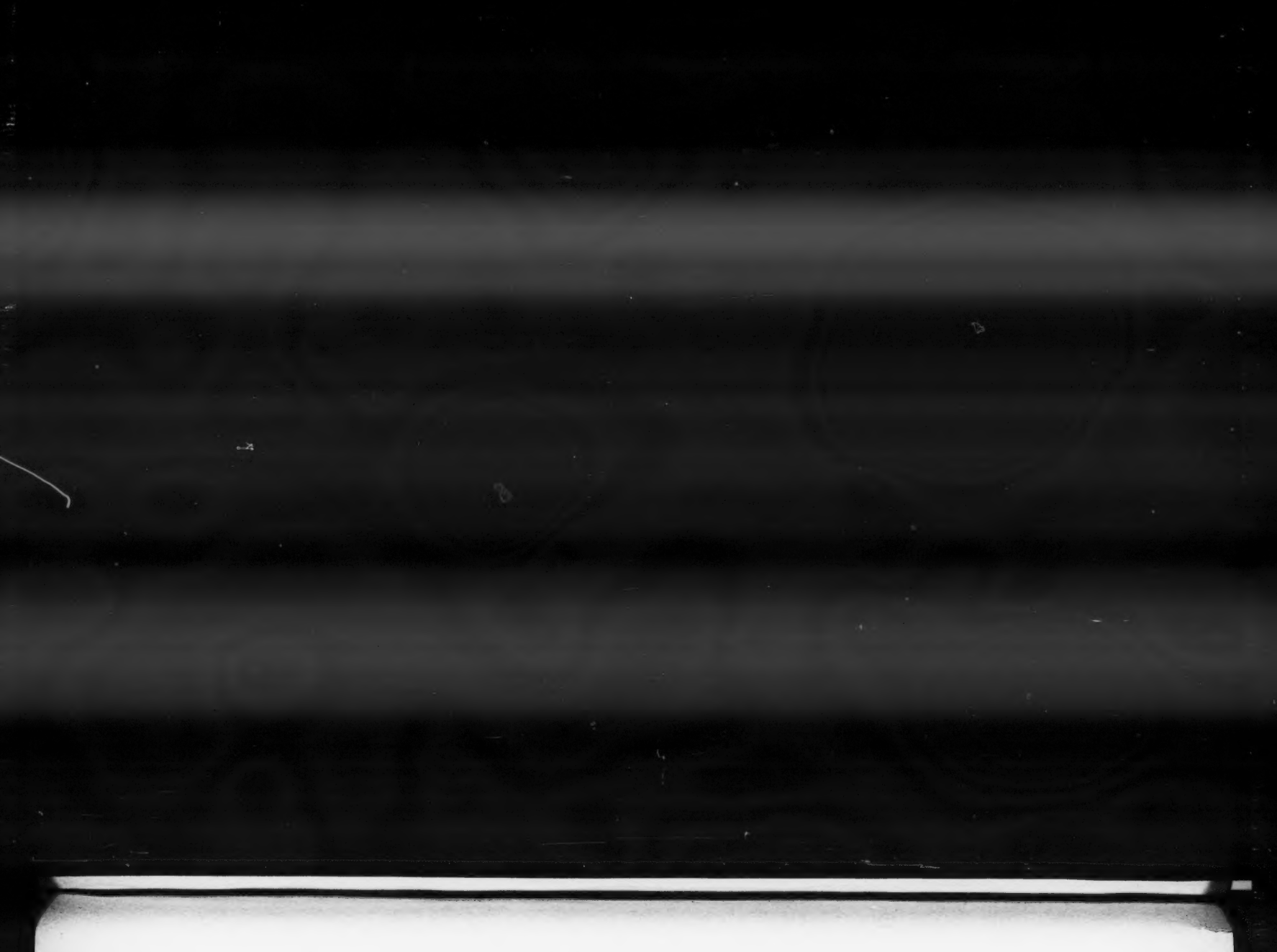
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